2/8/18

"The most difficult thing is the decision to act, the rest is merely tenacity."-Emelia Earhart

HW: "Even and Odd Functions" homework section
Test 1 on Thursday 2/15

AIM: How do we tell if a function is Even or Odd?

Warm Up:

1. The quadratic function $f(x)$ has a turning point at $(5,-8)$. If $g(x)=f(x+7)-3$, then at which of the following does $g(x)$ have a turning point?

(1) $(-2,-11)$ (3) $(-7,-3)$

(2) $(12,-11)$ (4) $(12,-5)$

$-7 \quad -3$

$(-2,-11)$

left 7 subtract 7 from x

down 3 subtract 3 from y

A2CC **Even and Odd Functions** Name: ______________________

We can classify the graphs of functions as either even, odd, or neither.

Even

A function is an even function if $f(-x) = f(x)$ for all x in the domain of f.

If (x, y) is a point on an even function, then so is $(-x, y)$

Even functions are symmetric with respect to the y-axis. This means we could fold the graph on the y -axis, and it would line up perfectly on both sides!

Odd

A function is an odd function if $f(-x) = -f(x)$ for all x in the domain of f.

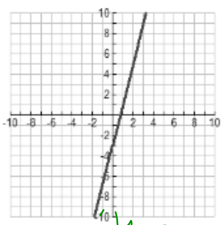
If (x, y) is a point on an odd function, then so is $(-x, -y)$

Odd functions are symmetric with respect to the origin. This means we can rotate image 180 degrees and it will appear exactly the same!

If we cannot classify a function as even or odd, then we call it neither!

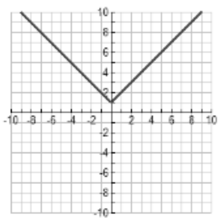
Directions: Determine graphically using possible symmetry, whether the following functions are even, odd, or neither.

1.



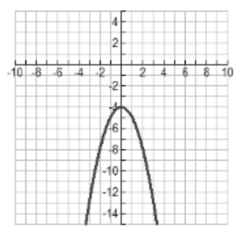
neither

2.



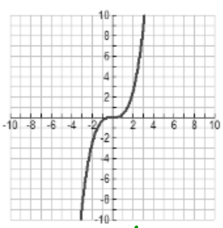
even

3.



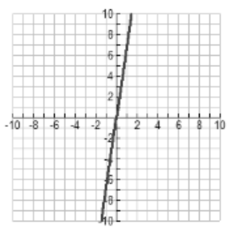
even

4.



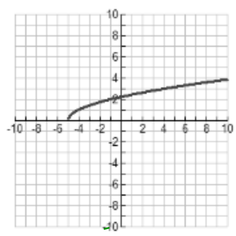
odd

5.



odd

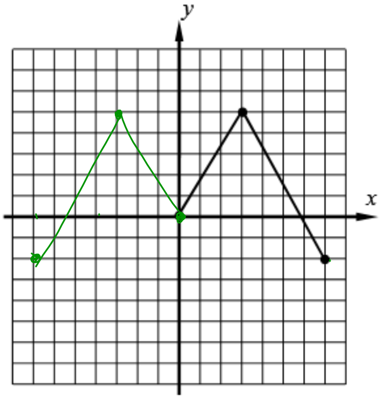
6.



neither

Consider the **partial graph** of the function $f(x)$ shown twice below. Sketch the other half of the function if in (a) $f(x)$ is **even** and in (b) $f(x)$ is **odd**. The three coordinate pairs are listed to help you plot.

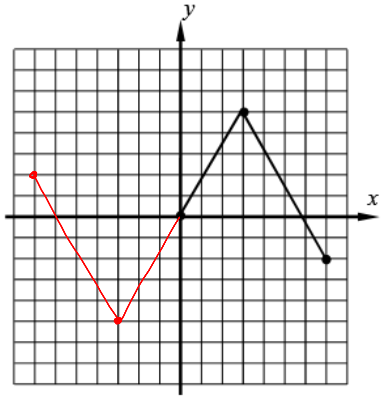
(a) **even**



$(0,0)$, $(3,5)$, $(7,-2)$

$(0,0)\ (-3,5)\ (-7,-2)$

(b) **odd**



$(0,0)$, $(3,5)$, $(7,-2)$

$(0,0)\ (-3,-5)\ (-7,2)$

Directions: Verify algebraically whether each function is even, odd, or neither!

1. $f(x) = x^3 - 6x^1$

$f(-x) = (-x)^3 - 6(-x)$

$= -x^3 + 6x$

$= -(x^3 - 6x)$

Odd

because we have - in front of the original

2. $g(x) = x^4 - 2x^2$

$g(-x) = (-x)^4 - 2(-x)^2$

$= x^4 - 2x^2$

even b/c when we plug in $(-x)$ we get the same function

3. $h(x) = x^2 + 2x^1 + 1$

$h(-x) = (-x)^2 + 2(-x) + 1$

$= x^2 - 2x + 1$

$= -(-x^2 + 2x - 1)$

not the same so try factoring out a negative

Neither

4. $f(x) = x^2 + 6$

5. $g(x) = 7$

6. $h(x) = x^5 + 1$

9. $h(x) = |x| - 1$

10. $f(x) = \dfrac{1}{1+x^2}$

11. $f(x) = \dfrac{3x^1}{5-x^2}$

$f(-x) = \dfrac{3(-x)}{5-(-x)^2} = \dfrac{-3x}{5-x^2} = -\left(\dfrac{3x}{5-x^2}\right)$ Odd

12. $f(x) = \dfrac{1}{3x+x^2}$

13. If $f(x)$ is an even function and $f(-3) = 7$, find the value of $2f(3) + 5f(-3)$.

14. If $f(x)$ is an odd function and $f(-3) = 7$, find the value of $2f(3) + 5f(-3)$.

$$-\frac{1}{2} = \frac{1}{-2} = -\left(\frac{1}{2}\right)$$

EVEN AND ODD FUNCTIONS
COMMON CORE ALGEBRA II HOMEWORK

FLUENCY

1. Given the partially filled out table below for $f(x)$, fill out the rest of it based on the function type.

(a) Even

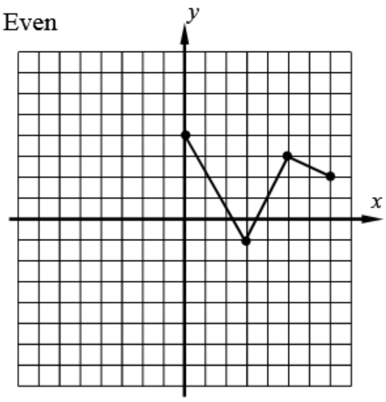
x	-3	-2	-1	0	1	2	3
y	5		-7	4		-4	

(b) Odd

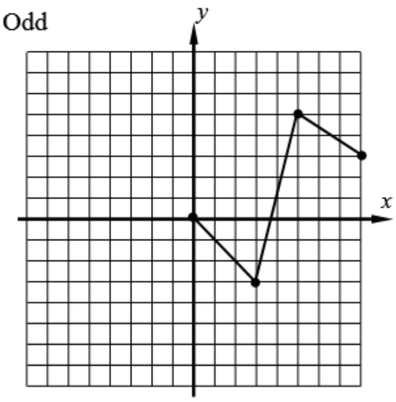
x	-3	-2	-1	0	1	2	3
y	5		-7	0		-4	

2. Half of the graph of $f(x)$ is shown below. Sketch the other half based on the function type.

(a) Even



(b) Odd



3. If $f(x)$ is an even function and $f(3)=5$ then what is the value of $4f(3)+2f(-3)$?

(1) 30 (3) 10

(2) 60 (4) 6 ________

4. If $g(x)$ is an odd, one-to-one function and if $g(7)=-2$, then which of the following points *must* lie on the graph of the inverse of $g(x)$, $g^{-1}(x)$. Explain how you made your choice.

(1) $(-7, 2)$ (3) $(2, 7)$

(2) $(2, -7)$ (4) $(7, -2)$ ________

5. Which of the following functions is even? Explain how you arrived at your choice.

(1) $y = x^2 - 4x$ (3) $y = 9 - x^2$

(2) $y = |x - 6|$ (4) $y = 4^x$

6. Determine algebraically if function $f(x) = \dfrac{4x^2 + 2}{x}$ is either even or odd..

Reasoning

7. Even functions have symmetry across the y-axis. Odd function have symmetry across the origin. Can a function be both even and odd?

8. Even functions have symmetry across the y-axis. Odd function have symmetry across the origin. Can a function have symmetry across the x-axis? Why or why not?